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URS Operating Services, Inc.
START2, EPA Region VIII
Contract No. 68-W-00-118

Gladstone Treatment Plant TBA - Phase II FSP
Signature Page
Revision: 0
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Page 1 of 4


PHASE II FIELD SAMPLING PLAN**GLADSTONE TREATMENT PLANT**
San Juan County, Colorado

EPA Contract No. 68-W-00-118
TDD No. 0405-0006

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**PHASE II FIELD SAMPLING PLAN
GLADSTONE TREATMENT PLANT
Cement Creek Watershed
San Juan County, Colorado**

TABLE OF CONTENTS

	<u>PAGE #</u>
SIGNATURE PAGE	i
DISTRIBUTION LIST	ii
TABLE OF CONTENTS	iii
1.0 INTRODUCTION	1
2.0 HISTORY AND LAND USE	2
3.0 DATA QUALITY OBJECTIVES	3
3.1 Step 1: The Problem Statement	
3.2 Step 2: Identifying the Decision	
3.3 Step 3: Identifying the Decision Inputs	
3.4 Step 4: Defining the Study Boundaries	
3.5 Step 5: Developing a Decision Rule	
3.6 Step 6: Defining Tolerance Limits on Decision	
3.7 Step 7: Optimizing the Sample Design	
4.0 FIELD ACTIVITIES	7
4.1 Concept of Operations	
4.1.1 Schedule	
4.1.2 Safety	
4.1.3 Property Access and Logistics	
4.2 Sample Locations	
4.3 Control of Contaminated Materials	
4.4 Analytical Parameters	
5.0 FIELD QUALITY CONTROL PROCEDURES	9
6.0 CHAIN OF CUSTODY	9
7.0 DATA QUALITY ASSESSMENT	10
7.1 Precision	
7.2 Accuracy	
7.3 Representativeness	
7.4 Comparability	
7.5 Completeness	
8.0 DATA REPORTING	12
9.0 LIST OF REFERENCES	13

TABLE OF CONTENTS (continued)

FIGURES

- Figure 1 Site and Sample Location Map
Figure 2 Conceptual Site Model

TABLES

- Table 1 Sample Locations and Rationale
Table 2 Sample Plan Checklist
Table 3 Sample Analytical Methods, Container Types, Volumes, Preservation, and Holding Times
Table 4 Non-Sampling Data Collection Rationale

APPENDICES

- Appendix A Technical Standard Operating Procedures
Appendix B Animas River Stakeholders Group

1.0 INTRODUCTION

This document is submitted in accordance with the task elements specified in Technical Direction Document (TDD) 0505-0008 dated May 19, 2005, issued to URS Operating Services, Inc. (UOS) Superfund Technical Assessment and Response Team 2 (START2) in Region VIII of the U.S. Environmental Protection Agency (EPA). The purpose of this TDD is to perform a Targeted Brownfield Assessment (TBA) of water treatment system options for the Cement Creek watershed near Gladstone, San Juan County, Colorado (Figure 1). The scope of work is to perform a Phase I, Phase II, and Phase III assessment of water treatment system options.

A Phase I is a report based on visual observation and document review. Areas of Concern (AOC) that may have environmental liabilities are identified. Future use of the site is considered. A Phase II is an investigation and assessment of AOCs identified in Phase I. Using limited sampling, the presence or absence of contamination is verified and the extent of areas that need to be remediated for redevelopment are defined. Conceptual and risk management plans are developed and the results are used to estimate the cost of remediation. Risk-based remedial objectives can also be developed that are protective of current and anticipated future site uses and activities. A Phase III includes a Remedial Action Plan (RAP) that identifies and characterizes the areas of a site requiring remediation and provides remediation designs and costs. Remedial action activities are incorporated with the site's future use by blending remedial activities with the redevelopment plan.

9 This Phase II Field Sampling Plan (FSP) is a description of the field investigation that will be conducted to assess releases (related to previous mining activities) to the Cement Creek watershed. This work is being done prior to the completion of the Phase I because of the critical need to collect additional analytical data during this summer season. Mobilization and watershed sampling activities are scheduled to be performed in July 2005. Additional sampling is planned for fall 2005 low flow conditions and spring 2006 high flow conditions. A Phase II Report will present the results of the field sampling and will be completed when all validated analytical results described in this FSP are available. These data, along with previous data to be provided by the Animas River Stakeholders Group, will be used to evaluate water treatment requirements as part of the Phase III.

This FSP is designed to guide field operations and has been prepared in accordance with the TDD, the EPA "Quality Assurance Guidance for Conducting Brownfield Site Assessments," the EPA "Guidance for the Data Quality Objectives Process," "EPA Requirements for Quality Assurance Project Plans," the EPA "Guidance

for Quality Assurance Project Plans," the EPA "Guidance for Performing Site Inspections Under CERCLA," Interim Final, the "Region VIII Supplement to Guidance for Performing Site Inspections Under CERCLA," ASTM International (ASTM) "Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process," and ASTM "Standard Guide for Environmental Site Assessments: Phase II Environmental Site Assessment Process" (U.S. Environmental Protection Agency (EPA) 1998; EPA 1992a; EPA 1993; EPA 2000; EPA 2001a; EPA 2002; ASTM International (ASTM) 2004; ASTM 2000b). The field work will include sampling and non-sampling data collection. Sampling procedures will adhere strictly to those outlined in the UOS Technical Standard Operating Procedures (TSOPs) for field operations at hazardous waste sites (Appendix A) (URS Operating Services, Inc. (UOS) 2004). This FSP is intended to be used in conjunction with the UOS "Generic Quality Assurance Project Plan" (URS Operating Services, Inc. (UOS) 2005).

Added 7
app
samples
Characterization samples will potentially include ten surface water samples, and one field Quality Assurance/Quality Control (QA/QC) sample (in addition to the laboratory matrix spike/matrix spike duplicate (MS/MSD)) to be analyzed for total and dissolved Target Analyte List (TAL) metals. The QA/QC samples will follow the requirements of the "Region VIII Supplement to Guidance for Performing Site Inspections under CERCLA" and will include one duplicate sample (EPA 1993).

All samples will be analyzed either through the U.S. Geological Survey (USGS) Laboratory, an EPA Contract Laboratory Program (CLP) Routine Analytical Services (RAS), the EPA Region VIII Laboratory, or through a private contracted laboratory for total and dissolved TAL metals. Major contaminants of concern (COCs) have been identified by the Animas River Stakeholders Group and include zinc, copper, iron, aluminum, cadmium, and manganese.

2.0 HISTORY AND LAND USE

Gladstone is the site of an historic mining town that developed in the 1880s with the advent of mining in the surrounding area (Figure 1). The town was the central location and railroad terminus for the milling and shipping of mine ores from the surrounding three-square-mile valley. The town declined in the 1920s and no remnants of the town remain. The largest mine in the area, known as the Animas Mining District, was the Sunnyside Mine that closed in the 1990s and is now nearing completion of reclamation. The Gold King Mine is currently in inactive status. Both of these mines were partially accessed through the American Tunnel that has its portal in Gladstone (San Juan County Undated).

Previously the American Tunnel drained as much as 1600 gallons per minute (gpm) of water from the mines. A lime feed and settling pond type treatment facility was constructed in Gladstone in 1979 by Standard Metals Corporation. Water discharging from the American Tunnel was treated as required by the water discharge permit. The facility operations and mine ownership was later transferred to the Sunnyside Gold Corporation (SGC). Under jurisdiction of a court consent decree to terminate their discharge permit, SGC installed several bulkheads within the Sunnyside Mine that greatly reduced the amount of discharge from the American Tunnel. Seventy to one hundred gpm continue to discharge presumably from near surface groundwater. All terms of the consent decree were met by SGC. In January 2003 the treatment facility, operations, and permit were transferred to Gold King Corp. Gold King Corp owns much of the land through which the American Tunnel passes. Gold King continued to operate the treatment facility until September 2004, treating the remaining American Tunnel discharge and the Gold King discharge. Because of financial problems and the loss of the lease for the property where the settling ponds are located, Gold King terminated treatment operations. Discharge from the American Tunnel is now considered noncompliant (San Juan County Undated).

Numerous historic and now abandoned mines exist within a two-mile radius of Gladstone. They include Gran Mogul, Mogul, Red and Bonita, Evelyne, Joe and John, Lark, Upper Gold King, and Silver Ledge Mines (Figure 1). Some of these mines have acid mine drainage between 30 and 100 gpm that flows directly or indirectly into Cement Creek and eventually into the Animas River, which flows approximately seven miles downstream of Gladstone (San Juan County Undated).

3.0 DATA QUALITY OBJECTIVES

The EPA Data Quality Objectives (DQO) Process is a seven-step systematic planning approach to develop acceptance or performance criteria for EPA-funded projects. The following DQOs were developed by UOS based on information provided by the EPA TBA project manager, members of the Animas River Stakeholders Group, and the TBA application.

3.1 STEP 1: THE PROBLEM STATEMENT

Cement Creek, the receiving stream for the discharge of the American Tunnel and other mine drainage in the immediate area is unable to support aquatic life. Cement Creek is a major contributor of metals and acidity to the Animas River that has goal-based cold water aquatic life standards. Presently 15

total maximum daily load (TMDL) allocations are not being met for Cement Creek and the Animas River below Cement Creek's confluence (San Juan County undated).

A treatment plant is needed that will maximize metal removal to meet downstream water quality standards at minimal construction and operating costs. The major COCs include zinc, copper, iron, aluminum, cadmium, and manganese.

Where are they?
The project team includes stakeholders listed in Appendix B. A conceptual site model is provided in Figure 2.

3.2 STEP 2: IDENTIFYING THE DECISION

The decision to be made by the Animas River Stakeholders Group is the selection of a water treatment system near Gladstone that will reduce the release of metals into Cement Creek and the Animas River within the budget afforded by available construction and operational funding.

3.3 STEP 3: IDENTIFYING THE DECISION INPUTS

Make bullets
The answers to the following questions are required before a decision can be made. •What is the best location available in the vicinity of Gladstone for use as a treatment facility? •Is it practical to convey to a single treatment facility and then treat acidic mine drainage from multiple areas in the vicinity of Gladstone, potentially including the American Tunnel and the Evelyn Gold King, Mogul, Gran Mogul, Joe and John, and Red and Bonita mines? •Is it possible to treat Cement Creek water that is contaminated by natural processes and mines further upstream? •Is it feasibility to reopen the existing idle lime feed treatment plant that previously treated only the American Tunnel and the Gold King mine discharge and treat those discharges as well as the upper Cement Creek? •What are the legal issues related to the ownership and operation of a treatment plant? •What is the construction and operational budget for the treatment plant? •What are the construction and operation costs for each option? •What are the current metals loadings from the various sources being released to Cement Creek?

note spelling consistent throughout

Little or no analytical data has been collected for the upper Cement Creek since the late 1990s. Analytical data for current surface water conditions for all acid mine drainage and tributaries being

considered for treatment are required in order to calculate metals loadings to be used in determining treatment facility capacity for the various options. This FSP addresses only the acquisition of current analytical metals data in water to be used to assess current conditions and to calculate metals loadings in water.

3.4 STEP 4: DEFINING THE STUDY BOUNDARIES

The study boundaries are the major acid mine drainage sources within two miles of Gladstone, the American Tunnel, and the upper Cement Creek. Field work is generally limited to the May or June through October time frame because of snow accumulation. Flow rates are now declining from the 2005 high flow rate; therefore, sampling of near high flow conditions will be conducted as soon as possible in July. Sampling will also be conducted during low flow conditions in the fall before winter weather prohibits access. Finally, sampling may be conducted during 2006 high flow conditions. The TBA application states that the treatment plant pros and cons analyses and final report should be completed by July 2006.

3.5 STEP 5: DEVELOPING A DECISION RULE

No decision rule is required for the field sampling events. The data will be used to determine the treatment plant capacity required for the various treatment options.

The following factors will be evaluated in the decisionmaking process:

- Ability to meet TMDLs and/or water quality standards;
- Reduced metals and acid loading to Cement Creek and the Animas River from high concentration low volume sources;
- Treatment of multiple mine discharge sources;
- Treatment of Cement Creek water;
- Increased property valuations from decreased contamination and decreased liability from draining mines on the project and adjacent lands;
- Drinking water quality improvements for municipal water users in Durango, Colorado, and Aztec, Flora Vista, and Farmington, New Mexico;
- Benefits including aquatic resources, recreational users, fishermen, farmers, and wetlands;
- Construction and operating costs; and

Another boundary is impacts from fore closure on plant-use location of WTS

- Construction and annual operating budget for each option.

3.6 STEP 6: DEFINING TOLERANCE LIMITS ON DECISION ERRORS

Statistics will not be used in this decision process. The decision will be based on an analysis of each ⁿ alternative and an engineering evaluation and cost analysis of each viable alternative. The decision will be based on many factors that have yet to be clearly defined, including legal, budgetary, and funding issues.

For the sampling events, judgmental sampling will be used to bias samples toward areas of concern, which include the locations that are shown in Figure 1 and listed in Tables 1 and 2. These locations include eight mines, the American Tunnel, and Cement Creek above Gladstone. The laboratory data will be validated by an independent chemist to ensure that the quality of the data is adequate for the intended purpose. The data quality indicators will then be evaluated and a determination will be made as to whether the overall quality of the data is acceptable for use in calculating metals loading at each location. The Quality Assurance/Quality Control (QA/QC) samples that will be collected and evaluated to determine the quality of the data will include a duplicate surface water sample and triple volume surface water for laboratory spike and laboratory duplicate spike samples. The data acceptance criteria to be evaluated include precision, accuracy, comparability, representativeness, and completeness (See Section 7).

3.7 STEP 7: OPTIMIZING THE SAMPLE DESIGN

Sample locations will be field located by the project manager or leader of the field sampling crew based upon an understanding of known environmental conditions. More detailed information is available in Tables 1 through 4. The activities of this step are described in Sections 4.0 through 6.0.

4.0 FIELD ACTIVITIES

4.1 CONCEPT OF OPERATIONS

4.1.1 Schedule

The first field sampling event is scheduled for July 2005. Sampling is estimated to be completed within one week. The second sampling event will occur in fall 2005 and the third in spring 2006. Non-sampling data collection will also be performed as described in Table 4.

4.1.2 Safety

All field activities will be conducted in strict accordance with an approved UOS Site Health and Safety Plan, which will be developed before the start of field activities. It is anticipated that all field work can be accomplished in Level D personal protective equipment.

4.1.3 Property Access and Logistics

UOS will obtain property access with the assistance of the EPA Region VIII Brownfield Project Manager for this project and the Animas River Stakeholders Group. UOS will have written or verbal consent from all applicable property owners prior to accessing the property for purposes of accessing a sample location.

4.2 SAMPLE LOCATIONS

Potential sample locations include Cement Creek and tributaries to Cement Creek, mining adits and the American Tunnel. Potential sample locations are shown in Figure 1 and described in Tables 1 and 2.

4.3 SAMPLE COLLECTION METHODS

Surface water sampling will be conducted according to UOS TSOP 4.18, "Surface Water Sampling" by immersing the sample bottles directly into the sample media (UOS 2004). UOS will measure field parameters, which include pH, temperature, dissolved oxygen (DO), and electrical conductivity of each sample collected as described in TSOP 4.14 "Water Sample Field Measurements." All data will be recorded in a project logbook. Sampling will be conducted from the farthest downstream location to the farthest upstream location to minimize the potential for cross contamination.

4.4 SURFACE WATER FLOW MEASUREMENTS

Flow measurements will be collected at each surface water sample location after the samples are collected according to UOS TSOP 4.15, "Flow Measurement" (UOS 2004). Depending on conditions, flow will be collected with a flume, a 5-gallon bucket, or the Marsh McBirney flow sensor. Flow data will be used in the calculation of metals loading and flow will be measured at a suitable location within the sample reach that is as close as possible to the location where the surface water sample was collected. At the Cement Creek sample location a second flow measurement may be collected as a QA/QC check since the creek bottom is expected to be rocky.

4.5 CONTROL OF CONTAMINATED MATERIALS

how will it be handled? where will it go?

Investigation-derived waste (IDW) generated during the sampling activities will be handled in accordance with UOS TSOP 4.8, "Investigation Derived Waste Management," and the OERR Directive 9345.3-02, "Management of Investigation Derived Waste During Site Inspections," May 1991 (EPA 1991; UOS 2004).

4.6 ANALYTICAL PARAMETERS

add: Major carbon in TAL metals

Table 2, the Sample Plan Checklist, lists all sample parameters. All samples will be analyzed for total and dissolved TAL metals by USGS, a private contracted laboratory, the EPA CLP RAS, or the EPA Region VIII laboratory.

5.0 FIELD QUALITY CONTROL PROCEDURES

Measurement errors are reduced by following TSOPs for conducting field operations at hazardous waste sites (UOS 2004) and by following strict laboratory protocols. Such TSOPs reduce measurement errors by standardizing procedures such as sample collection methods and instrument calibration, maintenance, and use.

All samples will be handled and preserved as described in UOS TSOP 4.2, "Sample Containers, Preservation and Maximum Holding Times." Calibration of the pH, temperature, and conductivity meters will follow instrument manufacturers' instruction manuals and UOS TSOP 4.14, "Water Sample Field Measurements." Sample collection will progress from downstream to upstream to prevent cross contamination (UOS 2004). No decontamination of sampling equipment will be required because only dedicated equipment will be used.

The following samples will be collected to evaluate quality assurance at the property in accordance with the "Guidance for Performing Site Inspections under CERCLA," Interim Final September 1992, the "Region VIII Supplement to Guidance for Performing Site Inspections under CERCLA," and the "UOS Generic Quality Assurance Project Plan" (UOS 2005; EPA 1992a; EPA 1993):

- One duplicate aqueous sample per set of 20 aqueous samples collected. One will be required for this investigation; and
- One triple volume water sample to be used for an MS/MSD (the extra volume samples will not be labeled as separate samples).

The "UOS Generic Quality Assurance Project Plan" serves as the primary guide for the integration of QA/QC procedures for the Superfund Technical Assessment Response Team (START) contract (UOS 2005).

6.0 CHAIN OF CUSTODY

After sample collection and identification, all samples will be handled in strict accordance with the chain-of-custody protocol specified in UOS TSOP 4.3, "Chain of Custody" (UOS 2004).

7.0 DATA QUALITY ASSESSMENT

Data quality assessment to determine data quality and usability will include:

- A QA/QC review of field generated data and observations
- Individual data validation reports for all sample delivery groups;
- Review of the procedures used by the validator to qualify data for reasons related to dilution, reanalysis, and duplicate analysis of samples;
- Evaluation of QC duplicate sample and matrix spike laboratory control samples to assess the quality of the field activities and laboratory procedures;
- Assessment of the quality of data measured and generated in terms of accuracy, precision, and completeness; and
- Summary of the usability of the data, based upon the assessment of data conducted during the previous steps.

Data acceptance criteria for accuracy, precision, and completeness are expressed as quantitative and qualitative statements and are detailed below.

7.1 PRECISION

Precision is a measure of mutual agreement among duplicate or collocated sample measurements of the same analyte. The closer the numerical values of the measurements are to each other, the more precise the measurement. Precision for a single analyte will be expressed as the relative percent difference for results of field replicate samples, matrix spike duplicate samples for organic analyses, and duplicate samples for inorganic analyses. In addition, precision will be maintained by conducting routine instrument checks to demonstrate that operating characteristics are within predetermined limits. Precision goals are included in the table below. The precision goal for metals analysis of water is a relative percent difference (RPD) of $\pm 20\%$.

7.2 ACCURACY

Accuracy is a measure of bias in a measurement system. The closer the value of the measurement agrees with the true value, the more accurate the measurement. Accuracy will be expressed as the percent recovery of the analyte from a surrogate or matrix spike sample and occasionally from the analysis of a standard reference sample compared to actual analyte concentration. The accuracy goal for metals analysis of water is 75% to 125% recovery.

7.3 REPRESENTATIVENESS

Representativeness is a qualitative parameter that expresses the degree to which sample data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, or an environmental condition. The design of and rationale for the sampling program (in terms of the purpose for sampling, selection of sampling locations, the number of samples to be collected, the ambient conditions for sample collection, the frequencies and timing for sampling, and the sampling techniques) ensure that environmental conditions have been sufficiently represented.

Variations in data can be attributed to weather conditions including rain and snow fall, time of year, passage of time, and other factors. Previous data will be reviewed for trends and differences in conditions and flow rates for purposes of calculating treatment plant capacity required for the various options and reducing the possibility of a decision error. Reviewing the variations in previous data will allow for more accurate projections of the range of flow and metals loading and the capacity required to adequately treat the water.

7.4 COMPARABILITY

The comparability goal will be achieved through the use of TSOPs to collect and analyze representative samples, and by reporting analytical results in appropriate and consistent units. Each analytical procedure selected from among the acceptable options will be used throughout the investigation unless a rationale is provided for an alteration. In essence, comparability will be maintained by consistency in sampling conditions, selection of sampling procedures, sample preservation methods, analytical methods, and data reporting units. Deviations that will impact comparability will be documented in the Deviations section of the Phase II Analytical Results Report.

The extent to which this data will be comparable with data collected previously and in the possession of the Animas River Stakeholders Group is not known. The data have not been made available to UOS; therefore, a data quality assessment has not yet been conducted by UOS on those data.

7.5 COMPLETENESS

Completeness is a measure of the amount of valid data obtained from a measurement system, expressed as a percentage of the number of valid measurements that should have been collected according to the FSP (i.e., measurements that were planned to be collected) (EPA 2001b). The actual percentage of completeness is less important than the effect of completeness on the data set. There are many reasons samples may be uncollectible: weather, access, and site conditions. For example, a water body that existed when the FSP was designed might not contain water when the sample is scheduled for collection. Denial of access to collect a sample would also affect completeness. The completeness goal for this sampling event is 100%.

8.0 DATA REPORTING

UOS will provide preliminary and validated analytical results along with the results of the data quality assessment as soon as they become available.

9.0 LIST OF REFERENCES

ASTM International (formerly American Society for Testing and Materials) (ASTM). 2000a. Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process. ASTM Designation: E 1527-00. July 2000.

ASTM International (formerly American Society for Testing and Materials) (ASTM). 2000b. Standard Guide for Environmental Site Assessments: Phase II Environmental Site Assessment Process. 2000.

San Juan County. Undated. Gladstone Treatment Plant Assessment, A Targeted Brownfields Assessment Project Proposal.

U.S. Environmental Protection Agency (EPA). 1991. Office of Emergency and Remedial Response, "Management of Investigation- Derived Wastes During Site Inspections OERR 9345.302."

U.S. Environmental Protection Agency (EPA). 1992. "Guidance for Performing Site Inspections Under CERCLA," Interim Final September 1992.

U.S. Environmental Protection Agency (EPA). 1993. "Region VIII Supplement to Guidance for Performing Site Inspections Under CERCLA." January 1993.

U.S. Environmental Protection Agency (EPA). 1998. "Quality Assurance Guidance for Conducting Brownfield Site Assessments." EPA 540-R-98-038 OSWER 9230.00-83P PB98-963307 September 1998.

U.S. Environmental Protection Agency (EPA). 2000. "Guidance for the Data Quality Objectives Process" EPA QA/G-4. Copies may be obtained from the Quality Staff Home Page: www.epa.gov/quality August 2000.

U.S. Environmental Protection Agency (EPA). 2001a. "EPA Requirements for Quality Assurance Project Plans" EPA QA/R-5. March 2001.

U.S. Environmental Protection Agency (EPA). 2001b. EPA QA/G-5i 2001. Guidance on Data Quality Indicators. Peer Review Draft. September 2001.

U.S. Environmental Protection Agency (EPA). 2002. "Guidance for Quality Assurance Project Plans" EPA QA/G-5. December 2002.

URS Operating Services, Inc. (UOS). 2004. "Technical Standard Operating Procedures for the Superfund Technical Assessment and Response Team (START), EPA Region VIII.

URS Operating Services, Inc. (UOS). 2005. "Generic Quality Assurance Project Plan" for the Superfund Technical Assessment and Response Team 2, Region VIII. June 13, 2005.

Figure 1 Site and Sample Location Map

Figure 2 Conceptual Site Model



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**GLADSTONE WATER TREATMENT PLANT
SAN JUAN COUNTY, COLORADO**

FIGURE 1: Site and Sample Location Map

July 2005

UOS - START2
TDD No. 0505-0008

☐ Mine Site

Source:
Terraserver Orthophoto
September 19, 1998

SCALE: 1:12,000
1" = 1,000'

0 500 1,000 2,000
Feet

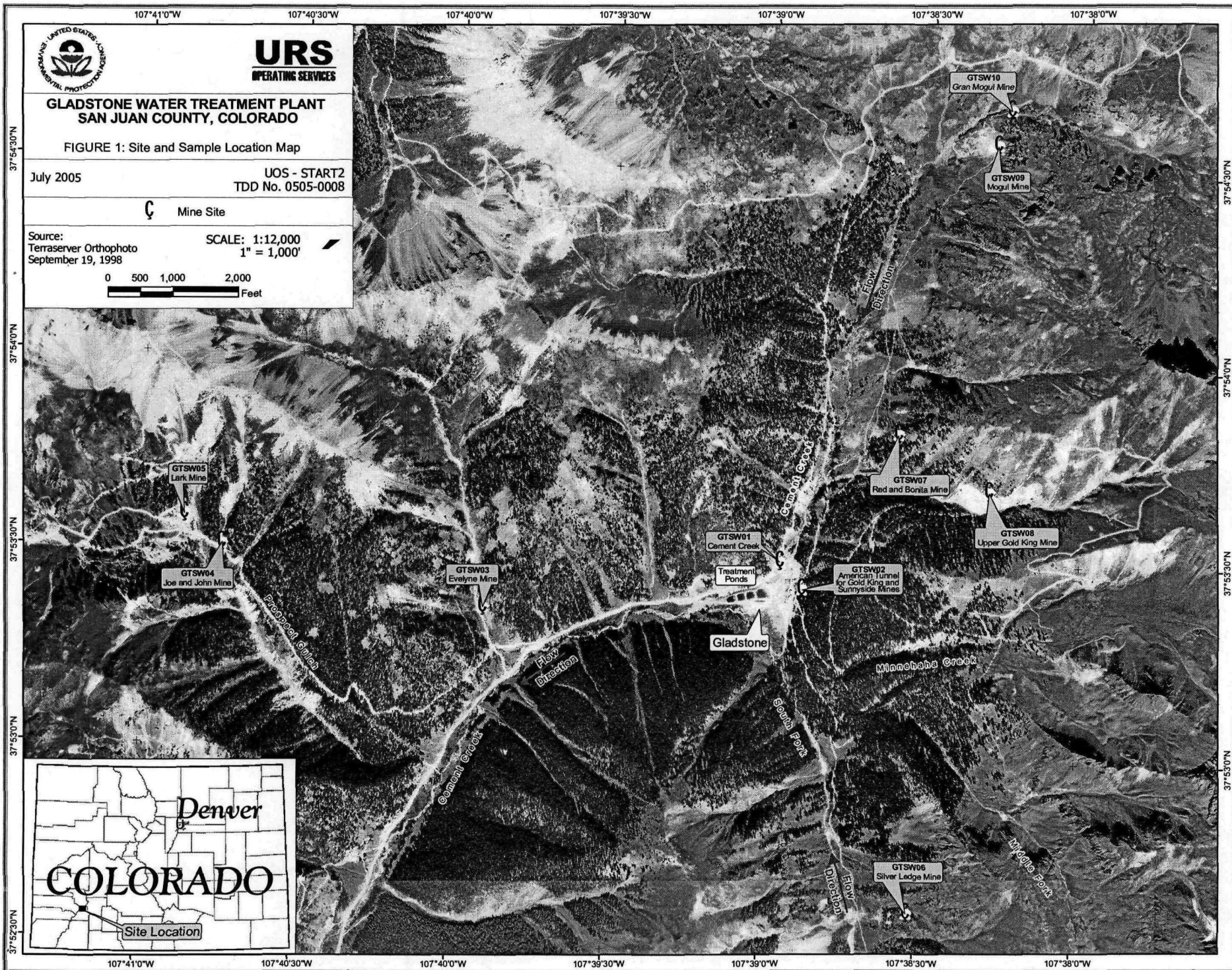


TABLE 1
Sample Locations and Rationale

Sample Matrix	Sample ID	Location	Latitude	Longitude	Rationale
Surface Water	GTSW01 (MS/MSD)	Cement Creek above treatment ponds.	To be determined in the field	To be determined in the field	Acquire data to calculate metals loading. MS/MSD is collected to test the precision of laboratory analytical methods.
	GTSW02	American Tunnel discharge.	To be determined in the field	To be determined in the field	Acquire data to calculate metals loading.
	GTSW03	Evelyne mine discharge.			Acquire data to calculate metals loading.
	GTSW04	Joe and John mine discharge.	N37°53'28.6"	W107°40'43.4"	Acquire data to calculate metals loading.
	GTSW05	Lark mine discharge.	N37°53'35.9"	W107°40'49.6"	Acquire data to calculate metals loading.
	GTSW06	Silver Ledge mine discharge.	N37°52'39.1"	W107°38'38.6"	Acquire data to calculate metals loading.
	GTSW07	Red and Bonita mine discharge.	N37°53'51.3"	W107°38'34.9"	Acquire data to calculate metals loading.
	GTSW08	Upper Gold King mine discharge.	To be determined in the field	To be determined in the field	Acquire data to calculate metals loading.
	GTSW09	Mogul mine discharge.	N37°54'41.2'	W107°38'19.4"	Acquire data to calculate metals loading.
	GTSW10	Gran Mogul mine discharge.	N37°54'40.1"	W107°37'49"	Acquire data to calculate metals loading.
QA/QC	GTSW11	Duplicate of sample GTSW01	To be determined in the field	To be determined in the field	Document the precision of sample collection procedures and laboratory analyses.

x 2 opp samples
(?)

TABLE 2
Sample Plan Checklist

Sample Location	Sample Matrix	Field Parameters				Analysis		Quality Control Samples	
		Temp	pH	DO	Cond	Total TAL Metals	Dissolved TAL Metals	Duplicate	MS/MSD
GTSW01	water	X	X	X	X	X	X	-	X
GTSW02	water	X	X	X	X	X	X	-	-
GTSW03	water	X	X	X	X	X	X	-	-
GTSW04	water	X	X	X	X	X	X	-	-
GTSW05	water	X	X	X	X	X	X	-	-
GTSW06	water	X	X	X	X	X	X	-	-
GTSW07	water	X	X	X	X	X	X	-	-
GTSW08	water	X	X	X	X	X	X	-	-
GTSW09	water	X	X	X	X	X	X	-	-
GTSW10	water	X	X	X	X	X	X	-	-
GTSW11	water	X	X	X	X	X	X	X	-

*columns for:
 major cat / anion?
 Alkalinity*

*Catons
 Anions*
Alkalinity not in tables

TABLE 3
Sample Analytical Methods, Container Types, Volumes, Preservation, and Holding Times

Sample Matrix	Analyte Analysis	Analytical Method Number	Container Number and Type ¹	Container Volume	Preservation ²	Technical Holding Time ³
Water	TAL Metals	EPA Method 200.7 or CLP-SOW ILM04.1	1 - HDPE	1 liter	Filter, cool to 4°C; Nitric Acid to pH <2	6 months (Hg - 28 days)

1 HDPE = high density polyethylene bottle and cap.

2 Preserve the samples as soon as they are collected. Add required preservatives to filtered samples following filtration.

3 Technical holding time is the time interval from sample collection until sample analysis. Technical holding times are determined by method and by matrix.

TABLE 4
Non-Sampling Data Collection Rationale

Data Element	Data Collection Strategy and Rationale
Sample Locations	All sample locations will be accurately plotted (latitude and longitude) by the Global Positioning System (GPS) and photo documented.
Flow Measurements	Flow measurements will be determined at all sample locations for use in calculation loadings.



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m

07/05/2005 04:03 PM

To wsimon@frontier.net

Sabrina Forrest/EPR/R8/USEPA/US@EPA,
cc holmes.mike@epamail.epa.gov,
Jan_Christner@URSCorp.com

bcc

Subject Gladstone TBA sampling event

pn 6638
#6112

Hi Bill

Thanks alot for your help last week. Based on your input, I suggested to Sabrina that sampling the mine drainages ASAP was necessary. In that light, we are preparing a SAP to sample the 10 locations that you suggested (Grand Mogul, Mogul, Red and Bonita, Gold King, Silver Ledge, American Tunnel, Upper Cement Creek, Joe & John, Evelyne, and Lark). My understanding is that the Red and Bonita may be the only one where access is an issue. Do you know the mining claim(s) for this one?

Also, I would like for you to comment on the draft SAP and for a list of people that you think should comment on it. Our tentative timing is to conduct the sampling and flowrate measurement during the week of July 18 in conjunction with the next ARSG meeting. By the way, Sabrina said that she is interested in having a remediation workgroup meeting this month if possible.

Thanks for you help.

Jerry
303-291-8215 office
720-810-0763 cell



Tony
Medrano/TMS/R8/USEPA/US
07/11/2005 11:38 AM

To Jerry_Goedert@URSCorp.com
Jan_Christner@URSCorp.com, lwirt@usgs.gov, Michael
Holmes/EPR/R8/USEPA/US@EPA, Mike
Wireman/EPR/R8/USEPA/US@EPA,
cc rob_robinson@blm.gov, Sabrina
Forrest/EPR/R8/USEPA/US@EPA,
stephanie_odell@co.blm.gov, wsimon@frontier.net

bcc

Subject Re: draft Gladstone SAP

Approvable.

If there are plans to send these to the R8 lab or ESAT, an LSR is needed, ASAP.

Tony Medrano, P.E.
Director
Quality Assurance Program Office
303.312.6336
720.352.6108 (mobile)



rob_robinson@blm.gov
07/12/2005 11:12 AM

To Jerry_Goedert@URSCorp.com
Sabrina Forrest/EPR/R8/USEPA/US@EPA, Michael
Holmes/EPR/R8/USEPA/US@EPA,
cc Jan_Christner@URSCorp.com, lwirt@usgs.gov, Tony
Medrano/TMS/R8/USEPA/US@EPA,
stephanie_odell@co.blm.gov, Mike
Wireman/EPR/R8/USEPA/US@EPA, wsimon@frontier.net
bcc
Subject Re: draft Gladstone SAP

Jerry:

Spelling of Evelyn should be Eveline consistent with name of mining claim.

Silver Ledge should be included in list of mines in Sec. 3.3.

Rob.

Rob Robinson, Environmental Engineer
Phone: 303-239-3642 FAX: 303-239-3799
Address: Bureau of Land Management
2850 Youngfield Street
Lakewood, CO 80215

Jerry_Goedert@URS
Corp.com

07/08/2005 01:08
PM

forrest.sabrina@epa.gov,
holmes.michael@epa.gov,
wsimon@frontier.net,
rob_robinson@blm.gov,
stephanie_odell@co.blm.gov,
lwirt@usgs.gov

To

wireman.mike@epa.gov,
Jan_Christner@URSCorp.com,
medrano.tony@epa.gov

cc

draft Gladstone SAP

Subject

Attached is a draft SAP intended to guide the sampling and flow measurement at 10 locations in and near Gladstone. The locations were arrived at based on discussions with Bill Simon. I would like to conduct this sampling

during the week of July 18th in conjunction with the next ARSG meeting. Please forward this SAP to anyone else that may be interested in commenting on it, however keep in mind our tight timeframe. I am looking to have comments back by 7/13. We will incorporate the comments and issue a hardcopy of final SAP.

Thanks in advance for your input.

Jerry
303-291-8215 ofc
720-810-0763 cell

(See attached file: Text.wpd) (See attached file: Glastone Figure 1.pdf)
[attachment "Text.wpd" deleted by Rob Robinson/COSO/CO/BLM/DOI] [attachment
"Glastone Figure 1.pdf" deleted by Rob Robinson/COSO/CO/BLM/DOI]



Laurie Wirt <lwirt@usgs.gov>

07/15/2005 12:58 PM

To rhjohnso@usgs.gov

Sabrina Forrest/EPR/R8/USEPA/US@EPA, Mike
cc Wireman/EPR/R8/USEPA/US@EPA,
holm.mike@epamail.epa.gov

bcc

Subject Re: Gladstone Sampling

Laurie Wirt, aqueous geochemist

U.S. Geological Survey
Geologic Division, Crustal Imaging and Characterization Team
P.O. Box 25046, MS 973
Denver Federal Center 80225-0046

(303) 236-2492 office
(303) 236-3200 fax

To: Jerry_Goedert@URSCorp.com
cc: forrest.sabrina@epa.gov, wireman.mike@epa.gov,
holm.mike@epa.gov
bcc: lwirt@usgs.gov, schurch@usgs.gov, rhjohnso@usgs.gov
Subject: Re: Gladstone Sampling
Laurie Wirt

Hi Jerry,

Per your request, below are my comments on your Phase II Field Sampling Plan. If you need to call me today, I can be reached at 303-442-5988. As we discussed on the phone this morning, the best time for me to go with you in the field will be on your second trip, during low-flow conditions of late summer/early fall when it will coincide with some of my other field work.

1.0 Introduction. As now written, it sounds as though you only plan to use the ASRG monthly sampling info from the Cement Creek/A72 gages and the new Phase II data you are proposing to collect. I know you are aware of the huge amount of published USGS data available, particularly the Prospect Gulch and upper Cement Creek tracer studies, which should be mentioned here. Also, the Colorado DMG has done some synoptic sampling of the Gladstone area. I know you need to get in the field ASAP, but in the longer term don't overlook these other sources.

In addition, I have quite a bit of unpublished data that should become available in the not-too-distant future (long before your July 2006 report deadline) which will be much more site-specific for your purposes. Unpublished USGS data I am personally aware of include water-quality samples from the Mogul, Gold King, Silver Ledge (aka by USGS as the Occidental), Red and Bonita adit discharges; and stream samples from North and South Forks, upper Cement Creek, Cement Creek blw Gladstone and abv and blw Prospect Gulch, and abv mouth of Prospect Gulch. In addition, we have detailed tracer studies of Prospect Gulch and Cement Creek between Gladstone and Fairview Gulch from Oct 2004, which we can open-file once the analyses and discharge measurements have been interpreted.

Figure&Table 1 and Sample Locations. Please be aware that the load from an adit is not necessarily equal to the total load from that particular mine. Often the adit discharge represents most of the problem, but sometimes the adit is relatively benign and it is infiltration and runoff from the waste dump or tailing pile that delivers the greatest contribution of metal contaminants. So sometimes we need to focus on the adit and other times it may be more appropriate to look at a reach of impacted stream with diffuse inflows and loads.

My next set of comments addresses your proposed sampling locations with this in mind.

a. Prospect Gulch. Both the Lark and the Joe and John adit openings have undergone gating and some remediation and thus it is the waste dump and

tailings piles that are now probably the greatest ongoing sources of contamination. Sampling the two adits will not accurately represent their load to the subbasin. And we shouldn't forget the Henrietta levels 7&8 and level 10 sites. Owing to the recent remediation activities, this reach is in recovery and it is hard to predict at the moment whether it is getting better or worse. All of the various mine-impacted inflows are quite small and diffuse. I think it would be more effective to treat the combined impacts of this complex as an impacted stream segment. I would sample the main stream just below tributary TR100 and just above TR700 (see Wirt and others, 2001, <http://pubs.usgs.gov/of/2001/ofr-01-0258/>). The stream is fairly small through here (usually on the order of .5 to 1 cfs at low flow) and it might be feasible to treat the entire impacted reach upstream from other larger inflows that come in near the bottom. The tracer reports are very helpful in terms of determining where the biggest loads are, and what kinds of stream discharges to expect.

b. Gold King and North Fork. Once again, the entire reach down from the Gold King is impacted. The adit is large and nasty, the tailing pile is large and steep, and there is a potential that the mine pool could be leaking through to the streambed. More work is needed here to assess flowpaths. I would sample the Gold King adit here, but I would also collect samples bracketing the North Fork abv the GK and abv the mouth.

c. Silver Ledge (or Occidental) and South Fork. I would also sample the Big Colorado because if it is feasible to treat the Occidental it might be simple to collect the adit discharge for the Big Colorado, too. I see it as potentially low hanging fruit. I don't think we need to sample the South Fork because both adit discharges are fairly discrete and are probably the major sources of contamination for each of their respective settings. Treating some of the South Fork adit flows may also help to buffer some of the lower pH adit flows in upper Cement.

d. Another mine in the vicinity that might be worth including is the Mammoth mine on the Georgia Gulch fan near the Upper Bog on Cement Creek. I believe it is Todd Hennessy property so I'd run this idea by Bill and Sabrina, or the Mikes, first.

Who did access on this?
e. Red and Bonita. I'm not sure whether you should sample the adit up top near the opening or at the base of the waste pile at the road culvert. It depends on your objectives. Diverting higher might help to dry out the pile. Diverting at the base might capture more of the impact. Again, more work is needed to better assess the degree of infiltration through the waste dump. Your call. Talk with Ray Johnson about where he collected his samples.

f. Mogul and Grand Mogul. I have not been to these recently, but similar logic applies. I think these flows are fairly discrete and will not be a problem, but if flow is diffuse it will need to be diverted to a single drainage before it is transported for treatment.

g. Cement Creek nr Gladstone abv SF, Eveline, and American Tunnel. No obvious complications and no comments.

Miscellaneous Comments.

a. Prospect Gulch subbasin is in a state of flux because of recent remediation activities and may not be representative of long-term conditions. It will be interesting to see if it is better or worse than last fall and previous years.

b. Don't have Fig. 2, the rest of the tables or appendices. Can't evaluate.

Ask him what he had offered up? Was related to.

c. Are you still planning to use USGS labs? Need to state what types of analysis are planned (I am presuming ICP-MS for 40 trace elements, ICP-AES for 27 major elements, IC for anions, alkalinity). You will need one filtered acidified (FA), one filtered unacidified (FU), and possibly an alkalinity, replicate, or archive. Please provide at least 100 ml for each aliquot.

d. Are you only collecting unfiltered samples? If you are using the USGS labs, the anions aliquot (IC) must be filtered using 0.45 micron filter (no acid) or it crashes the instrument.

e. If any of the samples have pH > 4.5 you should collect an alkalinity sample. USGS lab requires 250 ml chilled, no treatment. Or titrate in the field.

f. Do you have a standard reference water, or do you need the USGS lab to provide?

g. Collect the number of samples you need to get the job done and provide adequate QA/QC. Samples are relatively cheap compared to lack of information to make the right decision. Don't arbitrarily collect 10 samples when you might really need 12-15.

Hope you will find this helpful which is my sole intention and good luck in the field. You are welcome to call with any questions now or next week. Presuming you are still sending us the samples I will expect to hear from you when you get back.

Best,

Laurie

Laurie Wirt, aqueous geochemist

U.S. Geological Survey
Geologic Division, Crustal Imaging and Characterization Team
P.O. Box 25046, MS 973
Denver Federal Center 80225-0046

(303) 236-2492 office
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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 8

999 18TH STREET - SUITE 300

DENVER, CO 80202-2466

Phone 800-227-8917

<http://www.epa.gov/region08>

CONSENT FOR ACCESS TO PROPERTY

Owner Name: Mr. Jim Jackson

Owner Address: P.O. Box 4991, Aspen, CO 81612

Property Name and Location: Gladstone, Colorado

I, the owner of the property described above or his authorized representative, consent to officers, employees, and authorized representatives of the United States Environmental Protection Agency (EPA) entering and having access to the property described above during the week of June 27, 2005 for the following purpose:

1. A walking and/or driving tour (if roads are present) in order to view mines, related features, and associated surface water drainage present on and near the property.

Date _____ Signature _____

Title _____



Printed on Recycled Paper



Jerry_Goedert@URSCorp.com
m
07/07/2005 09:22 AM

To Sabrina Forrest/EPR/R8/USEPA/US@EPA
cc
bcc
Subject Fw: Gladstone mine tour

fyi

----- Forwarded by Jerry Goedert/Denver/URSCorp on 07/07/2005 09:19 AM

Tom Warlick
<Recreation-Prope
rties@cox.net>

07/07/2005 09:12
AM

Jerry Goedert
<Jerry_Goedert@URSCorp.com>

To

cc

Subject

Gladstone mine tour

Jerry,

It was a pleasure meeting you and sharing the tour of the mines around Gladstone by Steve Fearn.

Just to let you know the current situation with the Gold King mine and properties, Steve has asked for an extension on the the first deed of trust that I hold, which was due June 30. I have responded with a proposed set of terms for a six month extension and asked him to let me know by July 15 if he's going to accept. So we'll know by the end of next week whether I commence foreclosure or the mine and the old treatment plant site stay in his hands, at least temporarily.

Have you been able to reach any preliminary conclusions about the treatment plant ? How long do you think it's going to take to make a final decision on a definitive plan of action ?

I'll keep in touch.

Best regards,

Tom Warlick



Jerry_Goedert@URSCorp.co
m

07/07/2005 10:52 AM

To Sabrina Forrest/EPR/R8/USEPA/US@EPA, Michael
Holmes/EPR/R8/USEPA/US@EPA
cc Mike Wireman/EPR/R8/USEPA/US@EPA

bcc

Subject Fw: Gladstone Sampling

Sabrina and Mike

This is the USGS proposal for using their lab for sample analysis. Laurie had planned on requesting funds from you for the helium/tritium even without piggybacking our sampling event.

I checked with Randy Perlis on the prices. He said he thought metals analysis prices were reasonable but didn't have a feel for the Age-dating analyses. Paying for a whole pay period of Laurie's time seems a little excessive.

There is a little bit of a scheduling conflict in that I had hoped to do the sampling in conjunction with the ARSG meeting during the week of July 18.

That's it for now.

Jerry

----- Forwarded by Jerry Goedert/Denver/URSCorp on 07/07/2005 08:13 AM

Laurie Wirt
<lwirt@usgs.gov>

07/06/2005 10:17
PM

Jerry_Goedert@URSCorp.com

To

cc

Stanley E Church <schurch@usgs.gov>

Subject

Re: Gladstone Sampling

Hi Jerry,

I have put together a sampling budget that includes analytical costs for the major and trace elements, the age-dating, and one payperiod of my salary for one sampling trip. The analytical costs for ICP-AES and ICP-MS presume a 2-3 week turnaround time. Salary costs would double if you want me to go again in September, but it may be possible to send a lower cost alternate.

In addition to helping with the water-quality sampling and collecting the age-dating samples, I can assist with the wading discharge (EWI) and flume measurements. I have a AA meter and Baski cutthroat weir.

Perhaps you could discuss these expenses with Mike Holmes to see if there is enough funding left in the Brownfields program to cover at least one payperiod of my salary and the age dating analyses.

I have a schedule conflict and need to be here in the office on July 19th. I would prefer to go the week of July 25-29, or later. If the monsoon has kicked in and there has been a lot of rain I would prefer to postpone the age dating work until September.

I will be in the office tomorrow, but hard to reach. Best to send email. Let's talk again when I return July 14.

Laurie

(See attached file: budget for 10 samples.xls)

Laurie Wirt, aqueous geochemist

U.S. Geological Survey
Geologic Division, Crustal Imaging and Characterization Team
P.O. Box 25046, MS 973
Denver Federal Center 80225-0046

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----->	
	Jerry_Goedert@URS
	Corp.com
	07/01/2005 08:38
	AM
----->	

>-----
-----|

|
|
| To: lwirt@usgs.gov
|
| cc:
|
| Subject: Gladstone Sampling
|

>-----
-----|

Hi Laurie

I understand that you are planning to do some sampling at Gladstone this season. URS is also planning to conduct sampling in relation to a Brownfields Project for Sabrina Forrest. I would like to discuss this with you to see if we can coordinate timing.

Would you please give me a call?

Thanks

Jerry

303-291-8215

720-810-0763

(See attached file: budget for 10 samples.xls)



budget for 10 samples.xls



Jerry_Goedert@URSCorp.com
m
07/12/2005 01:37 PM

To sanjuancounty@frontier.net
cc Sabrina Forrest/EPR/R8/USEPA/US@EPA
bcc
Subject Gladstone TBA sampling plan attn: William Tookey

William:

Good afternnon.

I am not sure how familiar you are with this project. However, after discussion with Bill Simon during the first week of July, we were tasked to conduct sampling as part of the Brownfields TBA and to try to catch as much of Spring run-off as possible. Based on that direction, we hustled and put together a Sampling and Analysis Plan. Attached is the draft SAP for sampling to be conducted next week of 10 mine adit drainages (I am not including the map or Figure 2 because of the size of the files). Bill Simon and BLM have reviewed this and provided some feedback.

Please feel free to comment on this or to simply read it for informational purposes. However, if you would like to comment, I will need them before the end of the week.

Thanks

Jerry Goedert
303-291-8215 ofc
720-810-0763 cell

(See attached file: Text.doc)



Text.doc



Jerry_Goedert@URSCorp.com
m
07/11/2005 02:32 PM

To Sabrina Forrest/EPR/R8/USEPA/US@EPA
cc Jan_Christner@URSCorp.com
bcc
Subject Re: mines and owners for access

Sabrina, FYI. Debra Clemente is emphatic that she "and the other landowners" do not want anyone with the government on their property.

At this point, I don't think this is a big deal for what we need to do.

Jerry

Forrest.Sabrina@epamail.epa.gov

06/23/2005 02:29 PM

Jerry_Goedert@URSCorp.com,
Jan_Christner@URSCorp.com

To

cc

Subject

mines and owners for access

First off, Bill Simon supposedly has all the information to contact these people and some method for getting access taken care of, but he was not giving it up when we talked earlier today - see if he'll help you too.

Red & Bonita - did not show up in County assessors listings, but the Red did with Sunnyside as owner Contact Larry Perino 970-387 5533

Silver Ledge William Bangs - PO Box 1424 Beaver Oregon 73932

Pride of Bonita: Wm Bangs - PO Box 1424 Beaver Oregon 73932

Ryan Bennett 818 Partridge Cir, Golden CO 80403

Jack Bredlinger 12537 Hwy 82 Carbondale, CO 81623

Ivy Hampton/Debra Clement, 5751 Angelo Dr, Loomis CA 95650

Bruce Norquist PO Box 177, Metoline ?? 99152

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